STATE OF ILLINOIS

ILLINOIS COMMERCE COMMISSION

COMMONWEALTH EDISON COMPANY	:	
	:	
Application of COMMONWEALTH EDISON	:	
COMPANY, for a Certificate of Public	:	
Convenience and Necessity, Pursuant to Section 8-	:	No. 01-0833
406 of the Illinois Public Utilities Act, to construct,	:	
operate and maintain a new 138,000 volt electric	:	
transmission line in Cook County, Illinois.	:	

Direct Testimony of

FRANK FRENTZAS

Transmission Engineer
Commonwealth Edison Company

Q. What is your name and business address?

A. Frank Frentzas, Commonwealth Edison Company, Three Lincoln Centre, Oakbrook Terrace, Illinois 60181-4260.

Q. What is your position at ComEd?

A. I am ComEd's Transmission Engineer for underground projects. This is a system-wide position within Lines Engineering in the Planning and Engineering Organization of ComEd.

Q. What are your duties as Transmission Engineer?

A. I am ComEd's chief engineer for underground transmission functions. As such, I supervise all engineering and estimating work relating to the siting of underground transmission lines in conjunction with the associated substations and other facilities. My duties encompass evaluating the suitability of potential rights-of-way and sites for the construction of electric utility facilities, estimating the cost of construction of the transmission line facilities, participating in the selection of a preferred site and/or route for such facilities, and the development of a basic design for the transmission line facilities which is safe and consistent with good engineering practice and legal requirements. My responsibilities also include the complete engineering and design functions for most underground transmission line projects.

Q. How long have you worked at Commonwealth Edison Company?

A. For seven years.

Q. In what areas have you worked at ComEd?

A. All of my work has been in the transmission and distribution area. I started out in the right-of-way encroachment group. I was then assigned to the siting and estimating group, where I worked on finding suitable transmission line and substation sites, and estimating the cost of new transmission lines and substations. I have also worked in the reliability and standards area, the cable replacement team, as a Project Engineer in the underground transmission group, and as a resource coordinator for the engineering of transmission lines.

Q. Please describe your education.

A. I have a Bachelor Science in of Electrical Engineering from the Illinois Institute of Technology. I also have a Masters of Science in Electrical Engineering from the Illinois Institute of Technology.

Q. Are you familiar with the matters set forth in ComEd's petition in this docket?

A. Yes, I am.

Q. How have you become familiar with the project?

A. As ComEd's Transmission Engineer, I have the responsibility for the conceptual design and engineering of these two proposed lines, as well as the analysis of possible alternative designs and routes.

Q. To the best of your knowledge are the statements set forth in the Petition true and correct?

A. Yes, they are.

Q. What is the purpose of the Petition?

A. To obtain a Certificate of Public Convenience and Necessity authorizing ComEd to construct, operate, and maintain a new 138,000 volt underground electric transmission line connecting two ComEd substations. One substation is an existing substation, known as TSS 82 Crosby. The other substation is TSS 90 Dekoven, which ComEd expects to put into service during the summer of 2002.

Q. What is the purpose of your testimony in support of this Petition?

A. The purpose of my testimony is to describe the facilities which ComEd proposes to construct; to describe the process by which ComEd selected the route for those facilities; to explain why the proposed route and design should be approved; and to describe the process of constructing the proposed facilities and the cost thereof.

Q. What does Exhibit A to the Petition show?

A. Exhibit A shows the proposed route for the Line, as well as the typical cross sections of the conduit packages. It shows how the new transmission circuits will be contained in the conduit packages. While Exhibit A fairly represents the typical cross-sections, the design and location of the actual conduits may vary, as required by final engineering and construction needs.

Exhibit A shows where the proposed lines cross federal, state, and county highways and other major streets. It also shows the location of railroad tracks, the name of the railroad owning those tracks, the location of any pipelines and major power or communication lines to be crossed or paralleled within one-half mile of the line, and the

names of the utilities owning or operating such lines. As Mr. Jones testifies, additional power and communication lines routinely associated with the local delivery of utility and telecommunications services also exist within one-half mile of the proposed line, but are too numerous to show on Exhibit A.

Q. Please describe the route of the proposed line from Dekoven to Crosby.

A. The line will be constructed almost exclusively under city streets. As more fully described in Exhibit B to the Petition, the line will begin at ComEd's TSS 90 Dekoven substation, and go under Taylor Street to DesPlaines Avenue, run under DesPlaines Avenue past a future substation site at DesPlaines and Madison (preliminarily designated TSS 36 Clinton) to Fulton Street, go west one block on Fulton to Union Street, then go north on Union Street to Grand Avenue, and go east on Grand Avenue, under the North Branch of the Chicago River, to existing TSS 58 Grand, which is on Grand Avenue between Kingsbury and Orleans Streets. From the Grand substation, the line will exit on the north side of the substation, located within an existing duct package, following the existing ducts west on Ohio Street to Kingsbury, and north on Kingsbury to Chicago. At Chicago, the line will jog to the west and then continue north on Cambridge in newly constructed ducts. The line will then again jog to the west on an alley owned by the City of Chicago, and continue north on the City alley to Oak Street. The line will then go west on Oak Street to Crosby Street, north on Crosby, west on Hobbie, north on Kingsbury, and the west under the North Branch of the Chicago River to Halsted Street. The line will cross under Halsted Street to Haines Street, go west under Haines to Hickory Street, north on Hickory to Bliss Street, and west on Bliss and across North Branch Street to the new site of TSS 148 West Loop. The proposed line will exit the substation and go south

on North Branch Street to Halsted, and go north on Halsted to ComEd's terminal property on the west side of the canal, then go across the North Branch of the Chicago River and into ComEd's existing Crosby substation. There are two other segments we will build. One segment will connect the new West Loop substation to the two existing lines which connect to existing Crawford Station; the other segment will connect West Loop substation to the remaining portion of the two existing lines which are connected to Crosby substation.

Q. Please describe the circuit configuration and the type and design of the proposed lines.

A. Most of the line will share a common configuration. The underground duct package will be nine six-inch PVC plastic conduits encased in concrete. The transmission circuits will each use three 1600 mm^2 copper conductors with cross-linked polyethylene (XLPE) insulation. Each duct package will contain two three-phase 138 kV circuits, or six transmission conductors in total, two sheath bonding cables, and a fiber optic cable for system protection purposes. This configuration will be used from Point A to Point B (as shown on Exhibit A), from Point C to Point D (Grand substation), and from Point D to Point E (northern river crossing).

Certain sections of the line require different configurations. From Point B to Point C, the southern river crossing, the line will occupy an existing freight tunnel. Within the freight tunnel, the two circuits will each be contained in a ten inch PVC plastic conduit encased in concrete. Within each of the two conduits, each circuit will be comprised of three 1600 mm^2, XLPE insulated cables.

From Point E to Point F (the northern river crossing), the line will go underneath the North Branch of the Chicago River. At this crossing the line converges with the other

proposed 138 kV lines. The configuration at this location will include multiple circuits in two larger duct packages encased in concrete. The method used to install the duct packages will be determined in the final engineering phase.

From Point F to Point G (West Loop substation), the Grand to West Loop lines will be co-located with two 138 kV circuits extended from Crosby that are electrically connected to Ontario. The two pairs of circuits will be separated into two duct packages. These duct packages are designated as duct Detail 44A on Exhibit A, sheet 1 of 2. The duct packages will each consist of 16 six-inch PVC plastic ducts, and will contain two three-phase circuits, one circuit using 1600 mm^2, XLPE insulated cables running from Grand to West Loop, and the other circuit using 1200 mm^2, XLPE insulated cables that will carry power from West Loop to Ontario.

From Point G to Point F, the West Loop to Crosby line will be co-located with one 138 kV circuit extended from Crosby that is electrically connected to Clybourn. The circuits will be constructed in two duct packages. These duct packages are designated as duct Details 44B and 44D on Exhibit A, sheet 1 of 2. Each duct package will consist of 16 six-inch PVC plastic ducts. Duct package 44D will contain two three-phase circuits, one circuit using 1600 mm^2, XLPE insulated cables running from West Loop to Crosby, and the other circuit using 800 mm^2, XLPE insulated cable that will connect West Loop to Clybourn. Duct package 44B will contain one three-phase circuit using 1600 mm^2, XLPE insulated cables running from West Loop to Crosby.

From Point E to Point H the West Loop to Crosby line will be co-located with the two 138 kV circuits extended from Crosby that are electrically connected to Ontario and the one 138 kV circuit extended from Crosby that is electrically connected to Clybourn.

The circuits will be constructed in three duct packages. These duct packages are designated as duct Details 44A and 44C on Exhibit A, Sheet 1 of 2. Each duct package will consist of 16 six-inch PVC plastic ducts. The two 44A duct packages will each contain two three-phase circuits, one circuit using 1600 mm^2, XLPE insulated cables running from West Loop to Crosby, and the other circuit using 1200 mm^2, XLPE insulated cables that will carry power from West Loop to Ontario. Duct package 44C will contain the circuit using 800 mm^2, XLPE insulated cable that will connect West Loop to Clybourn.

From Point G to Point J (Division Street existing lines), all circuits will run under North Branch Street. Subject to final engineering, each circuit will consist of 2250 kcmil, paper insulated cables.

Q. Why is ComEd proposing to use the routes specified on Exhibit A?

A. They are the shortest, least-cost routes for the lines. They use existing transportation corridors, and minimize the number of landowners from whom ComEd needs property rights.

Q. Did ComEd seek alternative routes to the Line?

A. Yes, we looked at numerous alternatives.

Q. How did ComEd identify and analyze alternatives?

A. Given the locations of the substations to be connected, we canvassed the area for possible transportation rights-of-way that might be feasible for construction. We also discussed the possible routing with officials at the City of Chicago, and in particular the Bureau of

Inspections, to find viable routes, coordinate ComEd's construction with other possible construction activities, and to evaluate possible underground obstacles that could delay construction and drive up costs.

Q. For the Dekoven-to-Grand section of the line, describe what routes ComEd analyzed.

A. We examined a number of combinations of city streets and other transportation rights-of-way. There are so many streets and tunnels in the area that it made sense to break the analysis up into smaller chunks. So we actually looked first at getting from the DeKoven substation to the cut-in for a future substation at DesPlaines and Madison, which we are calling Clinton TSS. This is roughly halfway between DeKoven and Grand. The routes which we considered for the DeKoven to Clinton segment are shown in Attachment FF-1.

Q. Why is the proposed route superior to the other alternatives?

A. The proposed route, option 3 on Attachment FF-1, requires ComEd to obtain a right-of-way permit from just one source, the City of Chicago. It is direct and involves few turns. As shown on Attachment FF-1, it is the least cost of the alternatives.

Q. For the Clinton to Grand section of the line, describe what routes ComEd analyzed.

A. Again, we examined a number of combinations of city streets and other transportation rights-of-way. The segment requires us, in some way, to cross two obstacles: a railroad and the Chicago River. The routes which we considered are shown in Attachment FF-2. The route we propose is option 11B on Attachment FF-2.

Q. Why is the proposed route superior to the other alternatives?

A. The route we propose is least cost. It makes use of an existing freight tunnel to cross the river, avoiding additional regulatory approvals.

Q. For the Grand to West Loop section of the line, describe what routes ComEd analyzed.

A. We examined a number of combinations of city streets and other transportation rights-of-way. This segment requires the line to cross the North Branch Canal to reach the substation site on Goose Island. We also had to find a workable location under city streets that are already heavily congested with underground utilities. The routes which we considered are shown in Attachment FF-3. The route we propose is option 8 on Attachment FF-3.

Q. Why is the proposed route superior to the other alternatives?

A. The route we propose is the least cost. For part of the route, we can make use of an existing ComEd conduit that has open ducts. North of the existing conduit, on Cambridge Street, a section of the street is privately owned, and ComEd does not have an easement to place cables beneath it. Therefore, to avoid the use of a private street we propose to use an alley that belongs to the City of Chicago. To cross the canal we will construct a crossing common to the multiple transmission circuits for the West Loop Project.

Q. For the West Loop to Crosby section of the line, describe what routes ComEd analyzed.

A. Although the distance is not very far, we actually examined a number of combinations of city streets and other transportation rights-of-way. Again, this segment requires us, in

some way, to cross the Chicago River. The routes which we considered are shown in Attachment FF-4. The route we propose is option 6A on Attachment FF-4.

Q. Why is the proposed route superior to the other alternatives?

A. The route we propose, option 6A, is the least cost feasible alternative. It will use the same crossing under the North Branch Canal as the Grand to West Loop lines.

Q. You said it was the least cost "feasible" alternative. Did you look at other possibilities and reject them?

A. Yes. We looked at several schemes that would use an existing gas tunnel. On Attachment FF-4, these are identified as routes 3, 4, and 5A, 5B, and 5C. We were hoping we could save costs this way, but the tunnel does not have the physical capacity to accommodate the proposed transmission lines. Also, options 1A and 2A would be less costly than the proposed option 6A. However, it would not be possible to construct conduit in Haines Street and Hickory Avenue because these streets will already be full of conduit since they are included in the proposed option 8, shown on Attachment FF-3, for the Grand to West Loop line. In other words, the Haines/Hickory route is a good one, but we can only use it once, and we did.

Q. Finally, for the West Loop to Division Street tie-in line, describe what routes ComEd analyzed.

A. Although the distance is not very far, we examined eight different ways to accomplish the tie-in. The routes which we considered actual, viable alternatives are shown in Attachment FF-5. The route we propose is option 1 on Attachment FF-5.

213 Q. Why is the proposed route superior to the other alternatives?

214 A. The route we propose is least cost, and the shortest and most direct of the alternatives.

215 Q. Will the proposed lines be constructed in accordance with all applicable federal and state
216 regulations and orders of the Illinois Commerce Commission?

217 A. Yes. The lines will be constructed in accordance with all applicable regulations and
218 orders of the Illinois Commerce Commission, including 83 Ill. Admin. Code Part 305,
219 and the National Electric Safety Code.

220 Q. Is it anticipated that any problems of inductive interference will result from the lines?

221 A. No.

222 Q. How will the construction of the lines be managed?

223 A. The lines will be installed primarily by contractors supervised by ComEd. The contracts
224 involved will be managed and field inspection and construction review provided by
225 ComEd's Project and Contract Management Organization (formerly known as the Contract
226 Services Department). This organization and its predecessors have many years of
227 experience in managing this type of work and is adequately staffed to assure all work is
228 done per specifications in a complete workmanlike manner. The majority of ComEd's over
229 five thousand miles of transmission circuits have been installed by outside contractors
230 under direction of this organization and its predecessors.

231 Q. What is the length, estimated direct cost, and cost per foot of the proposed transmission
232 lines?

A. We estimate the direct cost of the lines at $59 million in 2002 dollars. The total length of transmission line is 6.14 miles. This translates to a unit cost of $1,820 per foot. The main cost components are: (1) the river crossing between the proposed West Loop and existing Crosby substations; (2) the structures required to access the Chicago Freight tunnels; (3) conduit trench excavation and encased conduit bank installation; (4) 138kv cable & cable accessories; and (5) 138kV cable installation, splicing, and terminating.

Q. How do these estimated costs compare to previous underground transmission projects?

A. These figures are higher than most other projects. The reason they are high is because this project includes more than just burying conduits below city streets. There are two relatively short segments of this project which drive the overall costs higher. The first is the river crossing between the West Loop and Crosby substations, and the other is the river crossing on Grand Ave. If we deduct the estimated costs for just these two segments from the estimated total of $59 million, we would estimate the project cost to be $43 million. This translates to approximately $1,325 per foot, which is similar to the costs we have experienced in the past.

Q. What is the estimated cost of all the construction involved in this project, including substation work?

A. Our current estimate is $114 million in 2002 dollars. That includes the substation work at our existing DeKoven, Grand, and Crosby substations, and building a new transmission substation at West Loop.

Q. Do you have a copy of a street map that notes the location, dimensions, and excavation size of any new enclosures that are proposed for the Dekoven - West Loop - Crosby 138kV transmission lines.

A. What we have available at this time, which shows streets, is attached to the Petition as Exhibit A. More detailed information will become available when initial phases of the final engineering work is completed. These can be supplied to the Commission's Staff when they are completed.

Q. Do you have a map or drawing that illustrates how the existing 138 kV lines from Ontario, Clybourn, Rockwell, and Crosby substations will be re-routed and connected to the proposed West Loop substation?

A. Yes. Exhibit A to the Petition shows this information, as best we know it now. More detailed information will be available when we have completed the initial phases of the final engineering work. We can forward the more detailed drawings containing this data to the Commission's Staff when they are completed.

Q. When is the work to re-route 138kv lines from Ontario, Clybourn, Rockwell , and Crosby substations to the proposed West Loop substation, to occur?

A. The detailed schedule for this work will be developed considering the manpower resources required to do the work and the outage availability of the affected transmission lines and the associated substation equipment. The general schedule to complete this work is in the latter part of 2003.

Q. What permits will you require for this project?

274 A. Federal, City and Railroad permits will be required for this project.

275 Q. Have all applicable permits for this project been requested?

276 A. No. We will be applying for these permits shortly as part of our final engineering phase.

277 Q. Does this conclude your testimony?

278 A. Yes.

Chicago Optimization Project
Underground Transmission Lines

DeKoven TSS 90 to Clinton TSS
Route Alternatives

Route Option	Route Length (mi.)	Tunnels (mi.)	Surface Trench (mi.)	Estimated Route Cost ($mil.)	Route Description	Advantages	Disadvantages
1A	1.4	0.75	0.65	12.58	Cross Jefferson to Greenshaw St. to Clinton to Polk to freight tunnel transition at Canal St., to Jackson to Clinton to Monroe to Jefferson, exit tunnel at Jefferson and Monroe, Monroe to DesPlaines to Madison to TSS	Greenshaw has virtually no traffic whereas Taylor traffic is heavy. Clinton appears to have available space on west half, parking not metered on either side. Tunnel use minimizes impact on streets. Use of Monroe avoids area of St. Patrick's church at Adams & DesPlaines.	Access to tunnels costly, engineering time/costs increased. May not fit in portion of tunnel currently utilized by ComEd. Existing tunnel bulkhead sleeves may be inadequate.
1B	1.4	0.6	0.8	12.01	Cross Jefferson to Greenshaw St. to Clinton to Cabrini to area beneath elevated portion of Canal Street (Canal Street elevation ends just south of Harrison), to freight tunnel transition at Harrison to Jackson to Clinton to Monroe to Jefferson, exit tunnel at Jefferson and Monroe, Monroe to DesPlaines to Madison to TSS	Same as option 1A. Also, area below elevated portion of Canal Street is used only for parking - traffic is overhead.	Same as option 1A. Also, may not be cost-effective to use area below elevated portion of Canal Street since it ends a short distance (about 1.5 blocks north) of where the route would enter the area.
2A	1.35	0.67	0.68	11.51	Jefferson to Harrison to freight tunnel transition at Clinton, to Canal to Jackson to Clinton to Monroe to Jefferson, exit tunnel at Jefferson and Monroe, Monroe to DesPlaines to Madison to TSS	Similar advantages as option 1A, also may be able to combine excavation on Jefferson with the planned excavation for DeKoven TSS to Jefferson TSS run.	Access to tunnels costly, engineering time/costs increased. May not fit in portion of tunnel currently utilized by ComEd. Existing tunnel bulkhead sleeves may be inadequate. Utility congestion on Jefferson near Jefferson TSS. Jefferson is a "superpaver" test site from Madison to Roosevelt - the City does not want this disturbed. Obtaining a permit for work on Jefferson may be very difficult.
2B	1.4	0.67	0.73	11.72	Cross Jefferson to Greenshaw St. to Clinton to freight tunnel transition at Harrison, to Canal to Jackson to Clinton to Monroe to Jefferson, exit tunnel at Jefferson and Monroe, Monroe to DesPlaines to Madison to TSS	Similar advantages as option 1A, good alternate to option 2A if space not available on Jefferson.	Access to tunnels costly, engineering time/costs increased. May not fit in portion of tunnel currently utilized by ComEd. Existing tunnel bulkhead sleeves may be inadequate.
3	1.05	0	1.05	6.43	Jefferson to Taylor to DesPlaines to Madison to TSS	Low traffic volume on DesPlaines, no tunnel issues. The most direct route between substations.	DesPlaines has some utility congestion. The Chicago Fire Dept. on DesPlaines north of Van Buren, St. Patrick's church on DesPlaines & Adams, and the elementary school student drop-off area on DesPlaines south of Monroe could present potential traffic conjestion concerns.
4	1.05	0	1.05	6.43	Jefferson to Monroe to DesPlaines to Madison to TSS	May be able to combine excavation on Jefferson with the planned excavation for DeKoven TSS to Jefferson TSS run. Use of Jefferson & Monroe avoids area of St. Patrick's church at Adams & DesPlaines. No tunnel issues.	Traffic and utility congestion on Jefferson significantly increases north of Jackson. Jefferson is a "superpaver" test site from Madison to Roosevelt - the City does not want this disturbed. Obtaining a permit for work on Jefferson may be very difficult.

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5A	1.2	0	1.2	7.40	Cross Jefferson to Greenshaw St. to Clinton to Van Buren to Jefferson to Monroe to DesPlaines to Madison to TSS	Greenshaw has virtually no traffic whereas Taylor traffic is heavy. Clinton appears to have available space on west half, parking not metered on either side. Use of Jefferson & Monroe avoids area of St. Patrick's church at Adams & DesPlaines. No tunnel issues. Avoids busy part of Clinton north of Van Buren.	Utility congestion on Jefferson near Jefferson TSS. Traffic is heavier on Van Buren than Tilden or Congress. Traffic and utility congestion on Jefferson significantly increases north of Jackson. Jefferson is a "superpaver" test site from Madison to Roosevelt - the City does not want this disturbed. Obtaining a permit for work on Jefferson may be very difficult.
5B	1.2	0	1.2	7.40	Cross Jefferson to Greenshaw St. to Clinton to Tilden St. to Jefferson to Monroe to DesPlaines to Madison to TSS	Same as 5A, also virtually no traffic on Tilden. Not a CTA bus route. Avoids Greyhound Bus depot on Congress.	Utility congestion on Jefferson near Jefferson TSS. Traffic and utility congestion on Jefferson significantly increases north of Jackson. Jefferson is a "superpaver" test site from Madison to Roosevelt - the City does not want this disturbed. Obtaining a permit for work on Jefferson may be very difficult.
5C	1.2	0	1.2	7.40	Cross Jefferson to Greenshaw St. to Clinton to Congress St. to Jefferson to Monroe to DesPlaines to Madison to TSS	Same as 5A, also virtually no traffic on Congress. Alternate to Tilden. Not a CTA bus route.	Utility congestion on Jefferson near Jefferson TSS. Traffic and utility congestion on Jefferson significantly increases north of Jackson. Jefferson is a "superpaver" test site from Madison to Roosevelt - the City does not want this disturbed. Obtaining a permit for work on Jefferson may be very difficult. Greyhound Bus depot on Congress.
5D	1.25	0	1.25	7.61	Cross Jefferson to Greenshaw St. to Clinton to Tilden to DesPlaines to Madison to TSS	An alternate in case DesPlaines south of Harrison is not feasible. Greenshaw has virtually no traffic whereas Taylor traffic is heavy. Clinton appears to have available space on west half, parking not metered on either side. No tunnel issues. Avoids busy part of Clinton north of Van Buren. Completely avoids Jefferson "superpaver" test site except for crossing Jefferson. Tilden has virtually no traffic and is not a CTA bus route. Avoids Greyhound Bus terminal access on Congress Street. Avoids Van Buren (utility congestion, increased traffic, CTA bus route).	Jefferson is a "superpaver" test site from Madison to Roosevelt - the City does not want this disturbed. Obtaining a permit for work on Jefferson may be very difficult. If so, it may be necessary to bore under Jefferson, increasing the cost. Tilden is narrow.
6	1.3	0	1.3	N/A	Exit DeKoven TSS onto Taylor, cross Dan Ryan to Halsted to Madison, cross Kennedy to Clinton TSS site.	None	All streets crossing Dan Ryan and Kennedy Expressways are overpasses. Halsted crossing of Eisenhower Expressway is an overpass. Traffic congestion on Halsted in Greek Town (Van Buren to Monroe).

Chicago Optimization Project
Underground Transmission Lines

Clinton TSS to Grand TSS
Route Alternatives

Route Option	Route Length (mi.)	Tunnels (mi.)	Surface Trench (mi.)	Estimated Route Cost ($mil.)	Route Description	Advantages	Disadvantages
1	1.16	0.95	0.21	11.82	Exit TSS property on DesPlaines, transition to freight tunnel at DesPlaines and Randolph, DesPlaines tunnel to Fulton to Jefferson to Grand to Kingsbury to Illinois to Orleans to Grand, exit tunnel at Orleans and Grand, surface trench along Grand to TSS.	Majority of route utilizes tunnels, minimizing impact on street traffic. Entrance to tunnel at Randolph and DesPlaines is at a less-busy intersection that those on Jefferson. No at-grade railroad crossing issues. Use of tunnel (near Grand TSS) minimizes disturbance to condo-filled neighborhood. Adequate space exists in freight tunnel along this route to accomodate the required two 138kv circuits. Existing tunnel bulkhead sleeves are large enough to accomodate these circuits also.	Access to tunnels costly, engineering time/costs increased. Removal of existing elevator car debris is required in north branch of Illinois tunnel.
2	1.16	0.4	0.76	10.26	Exit TSS property on DesPlaines to Fulton to Jefferson, bore under railroad 1 block north of Fulton, surface trench through parking lot north of R.R., continue on Jefferson to Hubbard, bore under R.R. to Grand, transition to freight tunnel, to Kingsbury to Illinois to DesPlaines tunnel to Fulton to Jefferson to Grand to Kingsbury to Illinois to Orleans to Grand, exit tunnel at Orleans and Grand, surface trench along Grand to TSS.	Surface alternate to tunnels under DesPlaines, Fulton & Jefferson. Fulton and Jefferson portions have very low traffic volume. Use of tunnel (near Grand TSS) minimizes disturbance to condo-filled neighborhood. Adequate space exists in freight tunnel along this route to accomodate the required two 138kv circuits. Existing tunnel bulkhead sleeves are large enough to accomodate these circuits also.	Bore under railroad north of Fulton, and again between Hubbard and Grand. Pay parking lot between R.R. and Kinzie already has some buried ComEd service (found manholes). Verified w/ ComEd Real Estate and City of Chicago Map Department that the pay parking lot is on public right-of-way. Access to tunnels costly, engineering time/costs increased. Removal of existing elevator car debris is required in north branch of Illinois tunnel.
3	0.97	0.15	0.82	8.50	Exit TSS property on DesPlaines to Fulton to Jefferson, bore under railroad 1 block north of Fulton, surface trench through parking lot north of R.R., continue on Jefferson to Hubbard, bore under R.R. to Grand, transition to freight tunnel, cross under river to Kingsbury, exit tunnel, surface trench along Grand to TSS.	Same as option 2 except exit tunnel at Grand & Kingsbury & surface trench to TSS. Use if tunnels on Kingsbury, Illinois and Orleans are not feasible.	Same as option 2. Also, moderate to heavy traffic on Grand. Numerous condos in this area.
4	1.3	0.39	0.91	10.91	Exit TSS property on DesPlaines to Fulton to Clinton, bore under R.R. on Clinton to Kinzie to Jefferson to Hubbard, bore under R.R. to Grand, transition to freight tunnel, to Kingsbury to Illinois to DesPlaines tunnel to Fulton to Jefferson to Grand to Kingsbury to Illinois to Orleans to Grand, exit tunnel at Orleans and Grand, surface trench along Grand to TSS.	Avoids pay parking lot south of Kinzie & Jefferson. Surface alternate to tunnels under DesPlaines, Fulton & Jefferson. Fulton and Jefferson portions have very low traffic volume. Use of tunnel (near Grand TSS) minimizes disturbance to condo-filled neighborhood. Adequate space exists in freight tunnel along this route to accomodate the required two 138kv circuits. Existing tunnel bulkhead sleeves are large enough to accomodate these circuits also.	Bore under railroad on Clinton, and again between Hubbard and Grand. Existing abandoned "Street Car" rails semi-buried in pavement on Kinzie between Clinton and Jefferson (tear out or bore under?). Access to tunnels costly, engineering time/costs increased. Removal of existing elevator car debris is required in north branch of Illinois tunnel.
5	1.12	0.15	0.97	9.15	Exit TSS property on DesPlaines to Fulton to Clinton, bore under R.R. on Clinton to Kinzie to Jefferson to Hubbard, bore under R.R. to Grand, transition to freight tunnel, cross under river to Kingsbury, exit tunnel, surface trench along Grand to TSS.	Same as option 4 except exit tunnel at Grand & Kingsbury & surface trench to TSS. Use if tunnels on Kingsbury, Illinois and Orleans are not feasible.	Same as option 4. Also, moderate to heavy traffic on Grand. Numerous condos in this area.
6	1.24	0.95	0.29	------	Exit TSS property on DesPlaines to Washington to Clinton, enter trolley tunnel, cross under river, exit trolley tunnel at Washington & Franklin, transition to freight tunnel on Franklin, tunnel north under river to Kinzie to Orleans, exit tunnel at Orleans & Grand, surface trench along Grand to TSS.	Majority of route utilizes tunnels, minimizing impact on street traffic. No at-grade railroad crossing issues.	Access to tunnels costly, engineering time/costs increased. Insufficient space in Franklin Street tunnel to accommodate these circuits due to existing utility congestion and sump pump station located in tunnel under river.

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7	1.55	0.56	0.99	13.52	Exit TSS property on DesPlaines to Washington to Clinton, enter trolley tunnel, cross under river, exit trolley tunnel at Washington & Franklin, surface trench on Franklin to Randolph to LaSalle, enterLaSalle trolley tunnel south of Lake Street, tunnel north under river to Kinzie, exit tunnel at LaSalle & Kinzie, surface trench on Kinzie to Orleans to Grand to TSS.	Washington and LaSalle trolley tunnels are much wider than freight tunnels. No at-grade railroad crossing issues.	Access to tunnels costly, engineering time/costs increased. Franklin, Randolph & LaSalle streets have high traffic volume.
8	1.51	0.38	1.13	12.27	Exit TSS property on DesPlaines to Washington to Clinton, enter trolley tunnel, cross under river, exit trolley tunnel at Washington & Lower Wacker, surface trench on Lower Wacker to LaSalle, enterLaSalle trolley tunnel, tunnel north under river to Kinzie, exit tunnel at LaSalle & Kinzie, surface trench on Kinzie to Orleans to Grand to TSS.	Washington and LaSalle trolley tunnels are much wider than freight tunnels. No at-grade railroad crossing issues. Lower Wacker has low traffic volume. Lower Wacker is scheduled for reconstruction - could be an advantage depending on timing.	Access to tunnels costly, engineering time/costs increased. Lower Wacker (along river from Washington to LaSalle) is scheduled for reconstruction - coordination issues with this.
9	1.24	1.02	0.22	------	Exit TSS property on DesPlaines, transition to freight tunnel at DesPlaines and Randolph, Randolph east under river to Franklin, north under river to Kinzie to Orleans to Grand, exit tunnel at Orleans and Grand, surface trench along Grand to TSS.	Majority of route utilizes tunnels, minimizing impact on street traffic. Entrance to tunnel at Randolph and DesPlaines is at a less busy intersection that those on Jefferson. No at-grade railroad crossing issues. Use of tunnel (near Grand TSS) minimizes disturbance to condo-filled neighborhood.	Access to tunnels costly, engineering time/costs increased. Insufficient space in Randolph and Franklin tunnels to accommodate these circuits due to existing utility congestion and sump pump stations located in tunnels under rivers.
10A	1.34	0.4	0.94	10.35	Exit TSS property on DesPlaines to Fulton to Union (bore under railroad 1 block north of Fulton) to Kinzie to Desplaines to Grand, transition to freight tunnel, to Kingsbury to Illinois to Orleans to Grand, exit tunnel at Orleans and Grand, surface trench along Grand to TSS.	Surface alternate to tunnels under Desplaines, Fulton and Jefferson. Fulton, Union and Kinzie have very low traffic. Use of tunnel (near Grand TSS) minimizes disturbance to condo-filled neighborhood. Adequate space exists in freight tunnel along this route to accomodate the required two 138kv circuits. Existing tunnel bulkhead sleeves are large enough to accomodate these circuits also.	Bore under railroad north of Fulton. Feasibility of surface trench on Kinzie at DesPlaines is in question due to unidentified electromechanical equipment located under Kinzie west of DesPlaines intersection. (The sound of motorized equipment was heard thru an opening in retaining wall on south edge of Kinzie, west of DesPlaines. Opening covered by steel grate - inaccessible.)
10B	1.12	0.15	0.97	8.46	Exit TSS property on DesPlaines to Fulton to Union (bore under railroad 1 block north of Fulton) to Kinzie to Desplaines to Grand, transition to freight tunnel, tunnel under river, exit tunnel at Grand & Kingsbury, surface trench along Grand to TSS.	Same as option 10A except exit tunnel at Grand & Kingsbury & surface trench to TSS. Use if tunnels on Kingsbury, Illinois and Orleans are not feasible.	Same as option 10A. Also, moderate to heavy traffic on Grand. Numerous condos in this area.
11A	1.34	0.4	0.94	10.35	Exit TSS property on DesPlaines to Fulton to Union (bore under railroad 1 block north of Fulton) to Grand, east on Grand, transition to freight tunnel, to Kingsbury to Illinois to Orleans to Grand, exit tunnel at Orleans and Grand, surface trench along Grand to TSS.	Surface alternate to tunnels under Desplaines, Fulton and Jefferson. Fulton and Union have very low traffic. If permitted to run duct thru private parking area (under bldg - Union St. north of Kinzie) it would avoid elevated intersection of Kinzie & DesPlaines. Use of tunnel (near Grand TSS) minimizes disturbance to condo-filled neighborhood. Adequate space exists in freight tunnel along this route to accomodate the required two 138kv circuits. Existing tunnel bulkhead sleeves are large enough to accomodate these circuits also.	Bore under railroad north of Fulton. Proposed route passes thru a private parking area (at grade) below a building, north of the intersection of Union and Kinzie. Despite presence of a ComEd manhole in this parking area, the right-of-way status is unknown.
11B	1.12	0.15	0.97	8.46	Exit TSS property on DesPlaines to Fulton to Union (bore under railroad 1 block north of Fulton) to Grand, east on Grand, transition to freight tunnel, tunnel under river, exit tunnel at Grand & Kingsbury, surface trench along Grand to TSS.	Same as option 11A except exit tunnel at Grand & Kingsbury & surface trench to TSS. Use if tunnels on Kingsbury, Illinois and Orleans are not feasible.	Same as option 11A. Also, moderate to heavy traffic on Grand. Numerous condos in this area.
12A	1.34	0.4	0.94	10.35	Exit TSS property on DesPlaines to Fulton to Union (bore under railroad 1 block north of Fulton) to Hubbard to alley (located 1/2 blk. west of Union) to Grand, east on Grand, transition to freight tunnel, to Kingsbury to Illinois to Orleans to Grand, exit tunnel at Orleans and Grand, surface trench along Grand to TSS.	Same as Option # 11A. Also, alley is an alternate to Union between Hubbard and Grand.	Same as Option #11A
12B	1.12	0.15	0.97	8.46	Exit TSS property on DesPlaines to Fulton to Union (bore under railroad 1 block north of Fulton) to Hubbard to alley (located 1/2 blk. east of Union) to Grand, east on Grand, transition to freight tunnel, tunnel under river, exit tunnel at Grand & Kingsbury, surface trench along Grand to TSS.	Same as option 12A except exit tunnel at Grand & Kingsbury & surface trench to TSS. Use if tunnels on Kingsbury, Illinois and Orleans are not feasible.	Same as option 12A. Also, moderate to heavy traffic on Grand. Numerous condos in this area.

13A	1.34	0.4	0.94	10.35	Exit TSS property on DesPlaines to Fulton to Union (bore under railroad 1 block north of Fulton) to Hubbard to DesPlaines to Grand, east on Grand, transition to freight tunnel, to Kingsbury to Illinois to Orleans to Grand, exit tunnel at Orleans and Grand, surface trench along Grand to TSS.	Same as Option # 11A.	Same as Option #11A
13B	1.12	0.15	0.97	8.46	Exit TSS property on DesPlaines to Fulton to Union (bore under railroad 1 block north of Fulton) to Hubbard to DesPlaines to Grand, east on Grand, transition to freight tunnel, tunnel under river, exit tunnel at Grand & Kingsbury, surface trench along Grand to TSS.	Same as option 13A except exit tunnel at Grand & Kingsbury & surface trench to TSS. Use if tunnels on Kingsbury, Illinois and Orleans are not feasible.	Same as option 13A. Also, moderate to heavy traffic on Grand. Numerous condos in this area.

Chicago Optimization Project
Underground Transmission Lines

Grand to West Loop
Route Alternatives

Route Option	Route Length (mi.)	Tunnels		Surface Trench (mi.)		Estimated Route Cost ($mil.)	Route Description	Advantages	Disadvantages
		Exist.	New	Reuse Exist.	New				
1A	1.73	0.41	0.08	0	1.24	31.67	Exit Grand TSS, surface trench east along Grand, enter freight tunnel at Grand & Orleans, to Illinois to Kingsbury to Grand, under the river, exit tunnel west of bridge, north along west edge of C&NW R.R. to Erie, run duct on grade along the north face of the structural/retaining wall under Erie (elevated) to point where Erie meets grade level, Erie to Peoria to Huron to Sangamon to Fry to May, cross under C&NW R.R. (via abandoned viaduct) to proposed property on west bank of river, new tunnel under river to West Loop site.	Use of tunnel (near Grand TSS) minimizes disturbance to condo-filled neighborhood. Tunnel on Grand is the only existing river crossing in the vicinity. Adequate space exists in freight tunnel along this route to accommodate the required two 138kv circuits. Existing tunnel bulkhead sleeves are large enough to accommodate these circuits also. Route passes under the elevated section of the Ohio Feeder Ramp - avoids having to bore under it. Avoids the need to bore under the elevated section of Erie (at Union). Avoids elevated sections of Halsted St. and Chicago Ave. Avoids busy Milwaukee Ave. Use of abandoned viaduct at May St. does not disturb existing traffic. Acquisition of property on west side of river opposite West Loop site will permit a greater number of transmission lines to be routed to TSS.	Access to tunnels costly, engineering time/costs increased. Issues with C&NW R.R. property? C&NW R.R. property already has buried telecommunications buried along west side. Space to run duct along wall under Erie is narrow, so it may require temporary disturbance to part of Chicago Tribune delivery truck parking lot. Proposed route crosses property south of west bank site - issues?
1B	1.72	0.41	0.08	0	1.23	31.63	Same as option 1A except instead of duct along wall under Erie, bore from railroad yard under the elevated intersection of Erie & Union westbound to point where Erie is at grade.	Same as option 1A. This is an alternate in case duct run along wall is not feasible. No issues with Tribune Company property.	Similar to 1A except: issues concern boring under Erie.
2A	1.85	0.41	0.08	0	1.36	32.19	Exit Grand TSS, surface trench east along Grand, enter freight tunnel at Grand & Orleans, to Illinois to Kingsbury to Grand, under the river, exit tunnel west of bridge, north along west edge of C&NW R.R. to Erie, run duct on grade along the north face of the structural/retaining wall under Erie (elevated) to point where Erie meets grade level, Erie to Peoria to Huron to Sangamon to Fry to Elston to proposed property on west bank of river, new tunnel under river to West Loop site.	Same as 1A except: does not cross the property south of west bank site.	Access to tunnels costly, engineering time/costs increased. Issues with C&NW R.R. property? C&NW R.R. property already has buried telecommunications buried along west side. Space to run duct along wall under Erie is narrow, so it may require temporary disturbance to part of Chicago Tribune delivery truck parking lot. Increased traffic, possible utility congestion on Elston.
2B	1.84	0.41	0.08	0	1.35	32.14	Same as option 2A except instead of duct along wall under Erie, bore from railroad yard under the elevated intersection of Erie & Union westbound to point where Erie is at grade.	Same as option 2A. This is an alternate in case duct run along wall is not feasible. No issues with Tribune Company property.	Similar to 2A except: issues concern boring under Erie.
3	1.79	0.41	0.08	0	1.3	32.15	Exit Grand TSS, surface trench east along Grand, enter freight tunnel at Grand & Orleans, to Illinois to Kingsbury to Grand, under the river, exit tunnel west of bridge, Grand to Union, bore under Ohio Street Feeder Expressway (at grade), to Erie to Peoria to Huron to Sangamon to Fry to May, cross under C&NW R.R. (via abandoned viaduct) to proposed property on west bank of river, new tunnel under river to West Loop site.	Use of tunnel (near Grand TSS) minimizes disturbance to condo-filled neighborhood. Tunnel on Grand is the only existing river crossing in the vicinity. Adequate space exists in freight tunnel along this route to accommodate the required two 138kv circuits. Existing tunnel bulkhead sleeves are large enough to accommodate these circuits also. Route avoids C&NW R.R. & Tribune Company property. Avoids elevated sections of Halsted St. and Chicago Ave. Avoids busy Milwaukee Ave. Use of abandoned viaduct at May St. does not disturb existing traffic. Acquisition of property on west side of river opposite West Loop site will permit a greater number of transmission lines to be routed to TSS.	Access to tunnels costly, engineering time/costs increased. Boring under Ohio Street Feeder may be costly. Proposed route crosses property south of west bank site - issues?
4	1.9	0.41	0.08	0	1.41	32.62	Exit Grand TSS, surface trench east along Grand, enter freight tunnel at Grand & Orleans, to Illinois to Kingsbury to Grand, under the river, exit tunnel west of bridge, Grand to Union, bore under Ohio Street Feeder Expressway (at grade), to Erie to Peoria to Huron to Sangamon to Fry to Elston to proposed property on west bank of river, new tunnel under river to West Loop site.	Same as 3 except: does not cross the property south of west bank site.	Access to tunnels costly, engineering time/costs increased. Boring under Ohio Street Feeder may be costly. Increased traffic, possible utility congestion on Elston.

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5	1.42	0	0.05	0	1.37	24.92	Exit Grand TSS, Grand Ave. to Kingsbury to Erie to Larrabee to Kingsbury ("fenced-off" section) to area on east bank of North Branch Canal opposite Crosby TSS, transition to new tunnel under the Canal to existing ComEd property on west bank (overhead terminal property), exit tunnel, cross Halsted to Haines to Hickory to Bliss to North Branch St. to West Loop site.	Not dependent on feasibility of Grand Avenue tunnel. Low traffic volume on Larrabee. New tunnel is between properties already owned by ComEd. New tunnel may be constructed to accommodate future needs.	Disruption of Grand Avenue traffic (moderate to heavy). Access to "fenced-off" section of Kingsbury in question as well as its feasibility (security guard would not grant access to walkdown team). New tunnel to Goose Island may be costly.
6	1.59	0	0.05	0	1.54	25.97	Exit Grand TSS, Grand Ave. to Orleans to Erie to Larrabee to Kingsbury ("fenced-off" section) to area on east bank of North Branch Canal opposite Crosby TSS, transition to new tunnel under the Canal to existing ComEd property on west bank (overhead terminal property), exit tunnel, cross Halsted to Haines to Hickory to Bliss to North Branch St. to West Loop site.	Alternate to option 5 - eastbound on Grand instead of westbound. Not dependent on feasibility of Grand Avenue tunnel. Low traffic volume on Larrabee. New tunnel is between properties already owned by ComEd. New tunnel may be constructed to accommodate future needs.	Some disruption of Grand Avenue traffic (moderate to heavy). Disruption of busy intersection of Orleans and Ohio (this is where the Ohio Feeder starts). Utility congestion on Erie? Access to "fenced-off" section of Kingsbury in question as well as its feasibility (security guard would not grant access to walkdown team). New tunnel to Goose Island may be costly.
7	1.63	0	0.05	0.44	1.14	24.83	Exit Grand TSS on Ohio St into existing empty duct to Kingsbury to Chicago (existing duct ends here) to new duct to Hudson to Oak to Crosby to Hobbie to Kingsbury, transition to new tunnel under the canal to existing ComEd property on west bank (overhead terminal property), exit tunnel, cross Halsted to Haines to Hickory to Bliss to North Branch St to West Loop site.	Utilizes existing ComEd duct packages from TSS to Kingsbury & Chicago intersection. New tunnel is between properties already owned by ComEd. New tunnel may be constructed to accommodate future needs.	Some disruption of Chicago Ave traffic (moderate to heavy). Utility congestion on Hudson and Oak. Local parking on west side of Hudson. Greater route length than alley option. New tunnel to Goose Island may be costly.
8	1.46	0	0.05	0.44	0.97	24.10	Exit Grand TSS on Ohio St into existing empty duct to Kingsbury to Chicago (existing duct ends here) to new duct to Cambridge to westbound alley 1/4 block north of Cambridge & Chicago intersection, alley turns northbound to Oak to Crosby to Hobbie to Kingsbury, transition to new tunnel under the canal to existing ComEd property on west bank (overhead terminal property), exit tunnel, cross Halsted to Haines to Hickory to Bliss to North Branch St to West Loop site.	Utilizes existing ComEd duct packages from TSS to Kingsbury & Chicago intersection. Alley between Cambridge and Larrabee not congested with utilities. New tunnel is between properties already owned by ComEd. New tunnel may be constructed to accommodate future needs.	Some disruption of Chicago Ave traffic (moderate to heavy). New tunnel to Goose Island may be costly. Additional manholes required due to "S-curve" of duct from Cambridge to westbound alley to northbound alley. Working space in alley and access to alley is less than in a street.

Chicago Optimization Project
Underground Transmission Lines

West Loop to Crosby
Route Alternatives

Route Option	Route Length (mi.)	Tunnels (mi.) Exist	Tunnels (mi.) New	Ovrhd. (mi.)	Surface Trench (mi.) Reuse Exist	Surface Trench (mi.) New	Estimated Route Cost ($mil.)	Route Description	Advantages	Disadvantages
1	0.47	0	0	0.1	0	0.37	---	Exit Crosby TSS 82 via new overhead terminal. Aerial crossing of North Branch Canal to new overhead terminal on west bank of canal on ComEd property (site of existing towers). Transition to below grade, cross Halsted to Haines to North Branch to West Loop TSS.	Low traffic volume on Haines and North Branch. Space available at existing overhead terminal site to install a new overhead terminal. There are existing overhead lines in this location. No tunnel issues.	Cost of new overhead terminals on each side of North Branch Canal. At-grade railroad crossing on North Branch (freight spur - currently in use?). Fedex truck depot on NE corner of Haines & Hooker.
1A	0.47	0	0.05	0	0	0.42	27.76	Exit Crosby TSS 82, cross Kingsbury to new tunnel, cross under North Branch Canal, exit tunnel on existing overhead terminal property on west bank of canal (site of existing towers). Transition to surface trench, cross Halsted to Haines to North Branch to West Loop TSS.	Low traffic volume on Haines and North Branch. No overhead terminal/line issues. Tunnel may also be used for other T-lines routed to West Loop TSS.	Property rights issues on east side of canal where tunnel access shaft would be located. At-grade railroad crossing on North Branch (freight spur - currently in use?). Fedex truck depot on NE corner of Haines & Hooker.
2	0.5	0	0	0.1	0	0.4	---	Exit Crosby TSS 82 via new overhead terminal. Aerial crossing of North Branch Canal to new overhead terminal on west bank of canal on ComEd property (site of existing towers). Transition to below grade, cross Halsted to Haines to Hickory to Bliss to North Branch to West Loop TSS.	Same as option 1.	Same as option 1 except at-grade railroad crossing is on Bliss at North Branch.
2A	0.5	0	0.05	0	0	0.45	28.25	Exit Crosby TSS 82, cross Kingsbury to new tunnel, cross under North Branch Canal, exit tunnel on existing overhead terminal property on west bank of canal (site of existing towers). Transition to surface trench, cross Halsted to Haines to Hickory to Bliss to North Branch to West Loop TSS.	Low traffic volume on Haines, Hickory, Bliss and North Branch. No overhead terminal/line issues. Tunnel may also be used for other T-lines routed to West Loop TSS.	Same as option 1A except at-grade railroad crossing is on Bliss at North Branch.
3	0.83	0.1	0	0	0.2	0.53	23.51	Exit Crosby TSS 82 onto Kingsbury, to Division to existing Gas Tunnel under North Branch Canal, to existing duct bank at Division & Hooker, to Haines, transition to new duct on Haines to North Branch to West Loop TSS.	No overhead terminal issues. Gas tunnel (canal crossing) is existing. Can use abandoned existing duct on Hooker if "Division Street tie-in" options 5, 6, 7 or 8 are used. Low traffic volume on Haines and North Branch	Suitability of gas tunnel? If "Division Street tie-in" options 5, 6, 7 or 8 are NOT used (run on Division abandoned), the run on Hooker must be new. Most of Hooker is relatively narrow with perpendicular parking (industrial) on both sides. At-grade railroad crossing on North Branch (freight spur - currently in use?). Fedex truck depot on NE corner of Haines & Hooker.
4	0.86	0.1	0	0	0.2	0.56	24.00	Exit Crosby TSS 82 onto Kingsbury, to Division to existing Gas Tunnel under North Branch Canal, to existing duct bank at Division & Hooker, to Haines, transition to new duct on Haines to Hickory to Bliss to North Branch to West Loop TSS.	Same as option 3.	Same as option 3, except at-grade railroad crossing is on Bliss at North Branch.
5A	0.74	0.1	0	0	0.11	0.53	22.03	Exit Crosby TSS 82 onto Kingsbury, to Division to existing Gas Tunnel under North Branch Canal, to duct bank at Division & Hooker, to Hickory to Bliss to North Branch to West Loop TSS.	No overhead terminal issues. Gas tunnel (canal crossing) is existing. Can use abandoned existing duct on Division if "Division Street tie-in" options 5, 6, 7 or 8 are used. Low traffic volume on Hickory, Bliss and North Branch	If "Division Street tie-in" options 5, 6, 7 or 8 are NOT used (run on Division abandoned), the run on Division must be new. Heavy traffic volume on Division Street. CTA distribution center loading docks on SE corner of Division & Hickory. At-grade railroad crossing on Bliss at North Branch.
5B	0.77	0.1	0	0	0.19	0.48	22.52	Exit Crosby TSS 82 onto Kingsbury, to Division to existing Gas Tunnel under North Branch Canal, to duct bank at Division & Hooker, to Cherry to North Branch to West Loop TSS.	No overhead terminal issues. Gas tunnel (canal crossing) is existing. Can use abandoned existing duct on Division if "Division Street tie-in" options 5, 6, 7 or 8 are used. Low traffic volume on Cherry and North Branch. Also, if installing in abandoned duct on Division, this avoids work near CTA distribution center loading docks (on Division & Hickory).	If "Division Street tie-in" options 5, 6, 7 or 8 are NOT used (run on Division abandoned), the run on Division must be new. Heavy traffic volume on Division Street. Two at-grade railroad crossings on Cherry (freight spurs - currently in use?).
5C	0.68	0.1	0	0	0.22	0.36	20.63	Exit Crosby TSS 82 onto Kingsbury, to Division to existing Gas Tunnel under North Branch Canal, to duct bank at Division & Hooker, to alley between Cherry and North Branch to West Loop TSS.	No overhead terminal issues. Gas tunnel (canal crossing) is existing. Can use abandoned existing duct on Division if "Division Street tie-in" options 5, 6, 7 or 8 are used. Alley unlikely to have utility congestion. No railroad crossings. Also, if installing in abandoned duct on Division, this avoids work near CTA distribution center loading docks (on Division & Hickory).	Alley is narrow. If "Division Street tie-in" options 5, 6, 7 or 8 are NOT used (run on Division abandoned), the run on Division must be new. Heavy traffic volume on Division Street.

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5	0.57	0	0	0.1	0	0.47	---	Exit Crosby TSS 82 via new overhead terminal. Aerial crossing of North Branch Canal to new overhead terminal on west bank of canal on ComEd property (site of existing towers). Transition to below grade, go south on Halsted to North Branch to West Loop TSS.	Alternate path to Haines, Hickory & Bliss. Low traffic volume on North Branch. Space available at existing overhead terminal site to install a new overhead terminal. There are existing overhead lines in this location. No tunnel issues.	Cost of new overhead terminals on each side of North Branch Canal. Disruption of moderate to heavy traffic on Halsted during construction. At-grade railroad crossing on North Branch (freight spur - currently in use?).
6A	0.57	0	0.05	0	0	0.52	29.40	Exit Crosby TSS 82, cross Kingsbury to new tunnel, cross under North Branch Canal, exit tunnel on existing overhead terminal property on west bank of canal (site of existing towers). Transition to surface trench, go south on Halsted to North Branch to West Loop TSS.	Alternate path to Haines, Hickory & Bliss. Low traffic volume on North Branch. No overhead terminal/line issues. Tunnel may also be used for other T-lines routed to West Loop TSS.	Property rights issues on east side of canal where tunnel access shaft would be located. Disruption of moderate to heavy traffic on Halsted during construction. At-grade railroad crossing on North Branch (freight spur - currently in use?).

Chicago Optimization Project
Underground Transmission Lines

Division St. Tie-In
Route Alternatives

Route Option	Route Length (mi.)	Tunnels (mi.)	Surface Trench (mi.)	Estimated Route Cost ($mil.)	Route Description	Advantages	Disadvantages
1	0.37		0.37	2.56	Tie-in to existing 138kv line at Division and North Branch, run on North Branch to TSS. Leave TSS, run on North Branch to 138kv line at Division and North Branch (tie-in).	Shortest distance to Division Street. Possibly run both "legs" of tie-in in same duct or same excavation.	Utility congestion? (Check underground utility drawings.)
2	0.36		0.36	2.60	Tie-in to existing 138kv line at Division between North Branch and Cherry, run to TSS via alley between North Branch & Cherry. Leave TSS, run on North Branch to 138kv line at Division and North Branch (tie-in).	Alternate to option 1. Alley unlikely to have utility congestion.	Alley is narrow
3	0.45		0.45	3.26	Tie-in to existing 138kv line at Division and Cherry, run on Cherry to North Branch to TSS. Leave TSS, run on North Branch to 138kv line at Division and North Branch (tie-in).	Alternate to alley. Also an alternate to North Branch if both "legs" of tie-in cannot be run on North Branch. Available space (?) on east side of Cherry.	Two at-grade railroad crossings on Cherry (freight spurs - currently in use?).
4	0.44		0.44	3.22	Tie-in to existing 138kv line at Division and Cherry, run SE on Cherry to North Branch, west on North Branch to TSS. Leave TSS, return to Division Street 138kv line (tie-in) via alley between North Branch and Cherry.	Alternate in case North Branch cannot be used. Minimizes impact on North Branch.	Alley is narrow. Two at-grade railroad crossings on Cherry (freight spurs - currently in use?).
5	0.46		0.46	3.16	Tie-in to existing 138kv line at Haines & Hooker, run on Haines to North Branch, to TSS. Leave TSS, run on North Branch to 138kv line at Division and North Branch (tie-in).	Minimizes excavation on Division (a busy street). Comparatively low traffic volume on Haines & North Branch streets.	At-grade railroad crossing on North Branch (freight spur - currently in use?). Fedex truck depot on NE corner of Haines & Hooker.
6	0.48		0.48	3.25	Tie-in to existing 138kv line at Haines & Hooker, run SW on Haines to Hickory, NW to Bliss, SW to North Branch, NW to TSS. Leave TSS, run NW on North Branch to 138kv line at Division and North Branch (tie-in).	Alternate to option 5 in case Haines & North Branch intersection is congested underground. Almost no traffic on Bliss.	At-grade railroad crossing on Bliss at North Branch (freight spur - currently in use?). Fedex truck depot on NE corner of Haines & Hooker.
7	0.45		0.45	3.12	Tie-in to existing 138kv line at Haines & Hooker, run on Haines to North Branch, to TSS. Leave TSS, return to Division Street 138kv line (tie-in) via alley between North Branch and Cherry.	Alternate to option 5. Alley unlikely to have utility congestion. Minimizes excavation on Division (a busy street). Comparatively low traffic volume on Haines & North Branch streets.	Alley is narrow. At-grade railroad crossing on North Branch (freight spur - currently in use?). Fedex truck depot on NE corner of Haines & Hooker.
8	0.47		0.47	3.21	Tie-in to existing 138kv line at Haines & Hooker, run on Haines to Hickory to Bliss to North Branch, to TSS. Leave TSS, return to Division Street 138kv line (tie-in) via alley between North Branch and Cherry.	Alternate to option 6. Alley unlikely to have utility congestion. Minimizes excavation on Division (a busy street). Almost no traffic on Bliss.	Alley is narrow. At-grade railroad crossing on Bliss at North Branch (freight spur - currently in use?). Fedex truck depot on NE corner of Haines & Hooker.

Attachment
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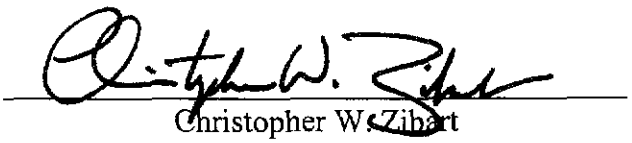
CERTIFICATE OF SERVICE

I, Christopher W. Zibart, do hereby certify that a copy of the foregoing Direct Testimony of Frank Frentzas was served upon all parties on the attached Service List by U. S. Mail this twenty-third day of January, 2002.



Christopher W. Zibart

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